

Inflation Targeting and Consumer Inflation Expectations in Poland

A Success Story?

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Abstract

Qualitative survey data on inflation expectations can be quantified with the use of probability or regression methods. This paper presents the results of probability methods implemented to estimate numerical measures of Polish consumer inflation expectations.

Inflation expectations constitute a subject of particular interest to central banks, especially those pursuing a monetary policy based on a strategy of inflation targeting. One of commonly emphasised features of this strategy is that it has proved to be useful in anchoring inflation expectations. The paper proposes a manner in which the achievement of this goal may be assessed *ex-post*. It is argued that to make such an assessment it is not sufficient to examine changes in the level of inflation expectations relative to the inflation target. It is rather necessary to analyse in detail the formation of inflation expectations, in particular the degree to which principal requirements of the rational expectations hypothesis, namely: unbiasedness and macroeconomic efficiency, are fulfilled.

The examination of consumer expectations in Poland leads to the conclusion that if the adoption of inflation targeting in Poland in 1998 and the commitment of monetary authorities to reach price stability, reflected in a fast disinflation process, decreased the level of inflation expectations. However, only very slight signs of consumer inflation expectations in Poland becoming more forward-looking appear in the most recent period.

Key Words: Inflation expectations, Surveys, Rationality, Inflation targeting, Poland

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Résumé

Les données qualitatives générales sur les prévisions d'inflation peuvent être quantifiées à l'aide de méthodes de probabilité ou de régression. Cet article présente les résultats de méthodes de probabilité appliquées à l'estimation de mesures numériques des prévisions d'inflation du consommateur polonais.

Ces prévisions constituent un sujet particulièrement intéressant pour les banques centrales, en particulier pour celles qui poursuivent une politique fondée sur une stratégie de cible d'inflation. L'une des caractéristiques de cette stratégie les plus souvent citée est qu'elle s'est avérée utile dans la fixation des prévisions d'inflation. Cet article propose une méthode permettant d'estimer *ex post* les résultats atteints. On argumente que l'examen des modifications du niveau des prévisions d'inflation par rapport à la cible de l'inflation n'est pas suffisant pour faire une telle évaluation. Il est plutôt nécessaire d'analyser en détail le mode de formation des prévisions d'inflation et, en particulier, de déterminer à quel degré les exigences principales permettant la formulation d'hypothèses de prévisions rationnelles, à savoir l'objectivité et l'efficacité macroéconomique, sont réalisées.

L'étude des prévisions du consommateur polonais conduit à la conclusion que l'adoption d'une cible d'inflation en Pologne en 1998 et les engagements des autorités monétaires d'atteindre la stabilité des prix se sont traduits par un processus rapide de désinflation et par une réduction du niveau des prévisions d'inflation. Cependant seuls de légers signes de prévisions d'inflation de la part du consommateur en Pologne devenu plus confiant apparaissent durant la période plus récente.

1 Introduction

Achievements in macroeconomic theory combined with empirical experiences of central banks make the analysis of inflation expectations a crucial factor in monetary policy making. This is especially true in the case of banks operating within an inflation targeting regime. The importance of inflation expectations results from the fact that they exert influence on the behaviour of economic agents, i.e., in terms of consumption, savings and investment decisions. Macroeconomic theory indicates that the transmission of monetary policy impulses and their impact on the real and nominal sectors of the economy bear a close relationship to forward-looking character of inflation expectations. Moreover, to the extent that they provide an unbiased predictor of future inflation, quantitative measures of expected inflation may constitute an important information variable taken into account in forward-looking considerations and monetary policy decisions. Finally, the inflation expectations of different groups of economic agents indicate the degree of confidence enjoyed by the central bank and the credibility of inflation targets, and also signal whether these targets are perceived as attainable.

Results of the survey carried out by the Bank of England among 94 central banks (see Mahadeva and Sterne, 2000) show that banks describing themselves as inflation targeters, put more emphasis on information concerning inflation expectations compared to the total sample of banks included in the survey (Table 1). Taking into account survey data on inflation expectations of different groups of agents, it occurs that even if their importance among inflation targeters seems to be lower than the role played by market information and surveys of outside forecasts, they constitute the source of information most frequently used in communicating with the public.

Having inflation expectations in the core of their inflation targeting strategy, central banks operating in this regime attempt to "anchor" them, which basically means lowering them and making them numerically consistent with the inflation target. International experiences suggest that inflation targeting may help in bringing down and guiding inflation expectations, although the reduction in inflation expectations usually does not happen immediately, but rather gradually over time.¹ The adoption of the direct inflation targeting strategy by the Monetary Policy Council of the National Bank of Poland in 1998² was also motivated by the necessity to break through inflationary expectations, which were perceived as *"one of the main obstacles in the process of steadily reducing inflation"* (see National Bank of Poland, 1998).

¹ See: Bernanke *et al.* (1999, pp. 297-98), Mishkin and Schmidt-Hebbel (2001, pp. 10-11).

² The evolution of the NBP strategy as well as the features and outcomes of direct inflation targeting in Poland are discussed in: Jonas and Mishkin (2003), Kokoszcyński (2002), Polański (2004).

Table 1 **Measures used in analyses of inflation expectations**

Information category	Categories of answers	Distribution of results	
		Total sample (94 central banks)	Banks describing themselves as <i>inflation targeters</i> (15 central banks) ^{a)}
Market information	<i>used</i>	44,7%	73,3%
	and published at least quarterly	12,8%	26,7%
	and published but not published	13,8%	26,7%
		18,1%	20,0%
	<i>not used</i>	55,3%	26,7%
Surveys of consumers/ producers/ others	<i>used</i>	42,6%	60,0%
	and published at least quarterly	18,1%	53,3%
	and published but not published	7,5%	0,0%
		17,0%	6,7%
	<i>not used</i>	57,4%	40,0%
Surveys of outside forecasts	<i>used</i>	41,5%	73,3%
	and published at least quarterly	14,9%	46,7%
	and published but not published	8,5%	13,3%
		18,1%	13,3%
	<i>not used</i>	58,5%	26,7%

a) This group includes central banks of: Albania, Armenia, Australia, Botswana, Canada, Chile, the Czech Republic, Israel, Jamaica, Mexico, Mongolia, New Zealand, Poland, Sweden and the UK.

Source: own calculations based on Mahadeva and Sterne (2000).

2 Survey Measures of Consumer Inflation Expectations – Probability Approach

2.1 Main assumptions of the probability approach

Qualitative survey data constitute an important information source concerning consumer inflation expectations. Attempts are being made to exploit survey data not only in a descriptive way, but also to quantify them and to use them in macroeconomic modelling.

The probability method was first employed by Theil (1952) in order to derive quantitative measures of inflation expectations which could represent an alternative to simple "balance

statistics", defined as the difference between the percentage of respondents reporting an increase in prices and the percentage of respondents reporting a decrease. Theil's method (1952), as well as its further implementations by Knöbl (1974), Carlson and Parkin (1975), and more recently by Taylor (1988), refers to surveys in which respondents are questioned whether prices are expected to "go up", "stay the same" or "go down".

There are two central assumptions in probability methods. Firstly, each individual is supposed to have a probability function over the expected price change. This may vary between individuals and over time, but it determines the responses to the survey question. Secondly, it is assumed that, if the expected price change falls within a certain interval centred on zero: $(-s, s)$, the respondents will report that prices are going to stay the same. This interval is termed "indifference interval".

The EC Consumer Survey as well as surveys carried out in Poland by Ipsos and GfK Polonia contain more response categories ("*prices will rise faster than at present*", "*prices will rise at the same rate*", "*prices will rise more slowly*", "*prices will stay at their present level*", "*prices will go down*"), meaning that in order to make use of all survey information, the quantification procedure has to be adjusted. The probability approach adopted to obtain numerical measures of Polish consumer inflation expectations, described in this paper refers to the canonical Carlson and Parkin (1975) method and assumes that, if the number of respondents is sufficiently large, the expected rate of price change is normally distributed in the population.³ Quantifying inflation expectations it then makes use of the fact that, in replying to the survey question regarding inflation expectations, respondents compare their predictions with the rate of price change as perceived when the survey is carried out. Indeed, two replies – that prices will "*rise at the same rate*" or "*stay at their present level*" – are in fact quantitative in nature. They provide an additional quantitative anchor, which can be exploited when converting qualitative survey data into quantitative measures. The mean of the expected rate of price change, derived on the basis of this method, depends on the distribution of responses to the survey question and on the perception of current price dynamics. The first factor describes the degree of respondents' optimism concerning future price movements as compared to price changes currently perceived. The second factor is a scale variable, which – along with the design of the survey question – serves respondents as a reference value in revealing their expectations.

A proxy for the perceived rate of price change used in Łyziak (2003), similarly as in Berk (1997), was the current rate of inflation, i.e. the most recent inflation rate available to respondents when answering the survey question regarding future prices. In this case, quantified measures of inflation expectations may be described as objectified, since they

³ Batchelor (1982) points out that if individual distributions are independent across respondents, have a common form and finite first and second moments, the survey results can be interpreted as a sampling from some aggregate distribution, which under the Central Limit Theorem is normally distributed.

assume that the respondents correctly perceive current price dynamics.⁴ Alternatively, the perceived rate of inflation may be derived on the basis of a survey question pertaining to the recently observed price developments (Berk, 2000; Forsells and Kenny, 2002, 2004). Indicators of inflation expectations quantified with a survey measure of recent price changes' perception may be called subjectified.

Subsequent parts of the paper present in detail quantification methods used to obtain both numerical measures of Polish consumers' inflation expectations.

2.2 Probability approach to quantification of inflation expectations

In subsequent parts of this paper, the following notation applies:

a	percentage of respondents expecting prices to rise faster;
b	percentage of respondents expecting prices to rise at the same rate;
c	percentage of respondents expecting prices to rise more slowly;
d	percentage of respondents expecting prices to stay at their present level;
e	percentage of respondents expecting prices to go down, ⁵
π_{+12}^e	expected rate of price change over the next 12 months in the population, assumed to be normally distributed with unknown parameters m , σ^2 ;
π_0	perceived rate of price change over the previous 12 months;
f	density function of the expected rate of inflation;
F	cumulative distribution function of the expected rate of inflation;
Nz	cumulative standardised normal distribution function.

⁴ The assumption that respondents correctly perceive current price movements and that their perception is equal to the most recent CPI figure available is debatable. It may be true when inflation is relatively stable and there are no shocks occurring between the release of the most recent inflation figure and the moment when the survey is carried out. However, it seems plausible to assume that subjective perception of current price movements is highly correlated with the official inflation indicator. From this point of view, in the case of objectified measures of inflation expectations, the conversion method simply "translates" respondents' subjective predictions into numbers consistent with statistical measures of price dynamics.

⁵ Contrary to other implementations of probability methods, such as Berk (1997), Berk (2000) or Forsells and Kenny (2002), the percentage of respondents giving the „difficult to say” reply is not proportionally allocated to the other response categories, but is divided into five equal parts and allocated to the remaining response categories. This is because of the high frequency of cases (in 1992-2000) where the fraction of respondents reporting that prices would fall was equal to zero.

The quantification of qualitative responses makes use of the fact that, in replying to the survey question regarding inflation expectations, respondents compare their predictions with the rate of price change as perceived when the survey is carried out. Probability methods presume that the respondents reporting that "prices will rise at the same rate" include agents whose expectations fall within an indifference interval centred on the perceived rate of inflation: $(\pi_0 - s, \pi_0 + s)$. For instance, if the perceived inflation rate is 2%, one might expect that the respondents who declare that prices will rise at the same rate are not exclusively composed of agents who predict that, over the next 12 months, the rate of inflation will be exactly 2%, but also individuals who think that future inflation will differ insignificantly from 2%, e.g., it might come to 1.8% or 2.1%.

It may be expected that the length of the indifference interval is contingent on the current rate of inflation. Batchelor (1986) argues that the theory of signal detection, suggesting that perceptual thresholds depend systematically on the level and noisiness of inflation, finds support in survey data from eight European countries.

Another indifference interval applies to respondents reporting that prices will stay at their present level, i.e., that the rate of price change over the next 12 months will amount to zero. It is assumed that this reply will be chosen by individuals expecting the inflation rate twelve months ahead to fall within an interval centred on zero: $(-t, t)$.

Contrary to the primary version of the Carlson and Parkin (1975) method, where only one indifference interval was considered and it was necessary to fix its length on an *ad hoc* basis, the adjusted quantification procedure makes the variables s and t , determining the length of indifference intervals, fully endogenous. Due to the broader scope of information contained in the surveys being considered, the only assumption that must be made with regard to the adjusted Carlson and Parkin (1975) approach refers to the type of distribution of the expected rate of inflation.

Figure 1 Adjusted Carlson and Parkin (1975) method

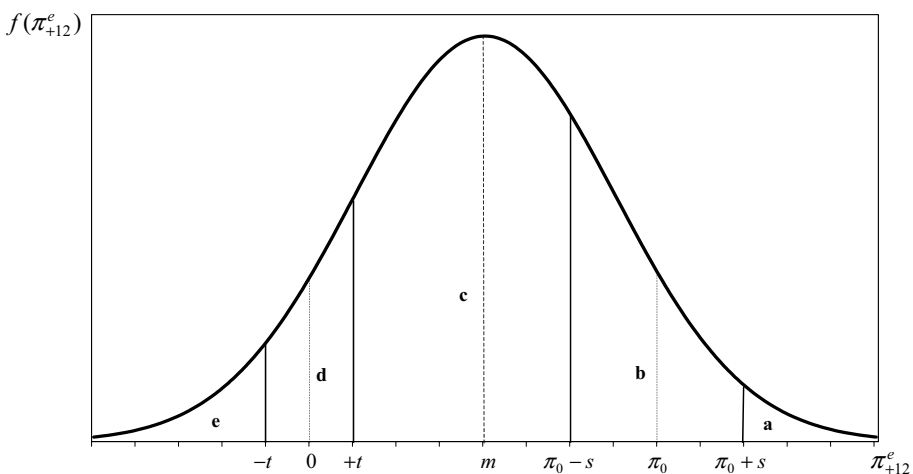


Figure 1 gives a graphical presentation of the adjusted Carlson and Parkin (1975) approach. The quantification method may be expressed algebraically in the following set of equations:

$$a = P(\pi_{+12}^e > \pi_0 + s) = 1 - F(\pi_0 + s), \quad (1)$$

$$b = P(\pi_0 - s < \pi_{+12}^e < \pi_0 + s) = F(\pi_0 + s) - F(\pi_0 - s), \quad (2)$$

$$c = P(t < \pi_{+12}^e < \pi_0 - s) = F(\pi_0 - s) - F(t), \quad (3)$$

$$d = P(-t < \pi_{+12}^e < t) = F(t) - F(-t), \quad (4)$$

$$e = P(\pi_{+12}^e < -t) = F(-t). \quad (5)$$

Equations (1)-(5) may be rearranged using the formula (6) of the normal density standardisation:

$$F(k) = Nz\left(\frac{k-m}{\sigma}\right), \quad (6)$$

where m is the unknown mean of the expected inflation rate and σ denotes its standard deviation. With this transformation, the system may be rewritten as follows:

$$a = 1 - Nz\left(\frac{\pi_0 + s - m}{\sigma}\right), \quad (7)$$

$$b = Nz\left(\frac{\pi_0 + s - m}{\sigma}\right) - Nz\left(\frac{\pi_0 - s - m}{\sigma}\right), \quad (8)$$

$$c = Nz\left(\frac{\pi_0 - s - m}{\sigma}\right) - Nz\left(\frac{t - m}{\sigma}\right), \quad (9)$$

$$d = Nz\left(\frac{t - m}{\sigma}\right) - Nz\left(\frac{-t - m}{\sigma}\right), \quad (10)$$

$$e = Nz\left(\frac{-t - m}{\sigma}\right). \quad (11)$$

There are four dependent variables in the above equations, namely m (mean of the expected rate of price change), σ (standard deviation), and also s and t (parameters

determining the length of indifference intervals). The explanatory variables comprise: a , b , c , d , e (fractions of respondents choosing the respective replies to the survey question) and π_0 (perceived rate of inflation). After solving the equations (7)-(11), the following results are obtained:

$$m = \frac{\pi_0 \cdot (C + D)}{C + D - (A + B)}, \quad (12)$$

$$\sigma = \frac{-2 \cdot \pi_0}{C + D - (A + B)}, \quad (13)$$

$$s = \frac{\pi_0 \cdot (B - A)}{C + D - (A + B)}, \quad (14)$$

$$t = \frac{\pi_0 \cdot (D - C)}{C + D - (A + B)}, \quad (15)$$

where: $A = Nz^{-1}(1-a)$; $B = Nz^{-1}(1-a-b)$; $C = Nz^{-1}(1-a-b-c)$; $D = Nz^{-1}(e)$.

The equation (12) defines the mean of the expected rate of inflation.

2.3 Probability approach to quantification of perceived inflation

The EC Consumer Survey question on the perception of currently observed price dynamics asks consumers the following question:⁶ "Compared with what it was 12 months ago, do you think that the cost of living is now: (1) very much higher; (2) quite a bit higher; (3) a little higher; (4) about the same, (5) lower; (6) don't know".

The following notation applies:

- a^p percentage of respondents claiming that prices are very much higher than 12 months ago;
- b^p percentage of respondents claiming that prices are quite a bit higher than 12 months ago;
- c^p percentage of respondents claiming that prices are a little higher than 12 months ago;
- d^p percentage of respondents claiming that prices are about the same as 12 months ago;

⁶ The EC Consumer Survey has been carried out in Poland since May 2001 by GfK Polonia.

- e^p percentage of respondents claiming that prices are lower than 12 months ago;
- π^p perceived rate of inflation, assumed to be normally distributed with unknown parameters $m^p, (\sigma^p)^2$;
- f^p density function of the perceived rate of inflation;
- F^p cumulative distribution function of the perceived rate of inflation;
- Nz cumulative standardised normal distribution function.

The quantification method proposed in this paper is consistent with the approach followed by Forsells and Kenny (2002, 2004) while deriving numerical measures of the perceived inflation in the euro area. They refer to the original version of the method developed by Carlson and Parkin (1975), expressing the percentage of respondents claiming that prices are about the same as 12 months ago (d^p) as the probability that the perceived inflation in the population falls within the indifference interval: $(-\delta, \delta)$. Similarly, the probability that perceived price dynamics exceeds the upper limit of the indifference interval equals the fraction of respondents declaring that prices are higher than 12 months ago ($a^p + b^p + c^p$). Finally, the percentage of respondents claiming that prices are lower than 12 months ago (e^p) corresponds with the probability of the perceived inflation being below the lower limit of the indifference interval.

Figure 2 Carlson and Parkin (1975) method as used to quantify perceived rate of inflation

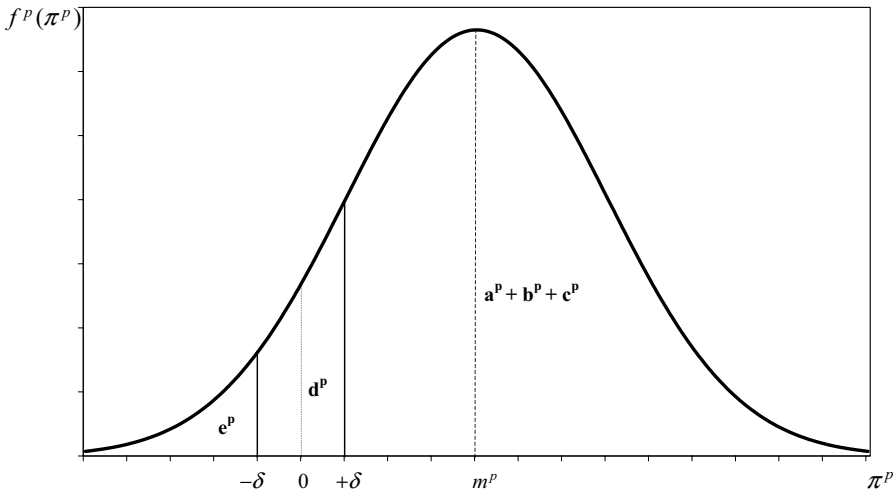


Figure 2 gives a graphical representation of the Carlson and Parkin (1975) method, used to quantify the perceived rate of inflation. The quantification method may be expressed algebraically in the following set of equations:

$$a^p + b^p + c^p = P(\pi^p > \delta) = 1 - F^p(\delta), \quad (16)$$

$$d^p = P(-\delta < \pi^p < \delta) = F^p(\delta) - F^p(-\delta), \quad (17)$$

$$e^p = P(\pi^p < -\delta) = F^p(-\delta). \quad (18)$$

Equations (16)-(18) may be rearranged using the formula (19) of the normal density standardisation:

$$F^p(k) = Nz\left(\frac{k - m^p}{\sigma^p}\right), \quad (19)$$

where m^p is the unknown mean of the perceived inflation rate and σ^p denotes its standard deviation. With this transformation, the system may be rewritten as follows:

$$a^p + b^p + c^p = 1 - Nz\left(\frac{\delta - m^p}{\sigma^p}\right), \quad (20)$$

$$d^p = Nz\left(\frac{\delta - m^p}{\sigma^p}\right) - Nz\left(\frac{-\delta - m^p}{\sigma^p}\right), \quad (21)$$

$$e^p = Nz\left(\frac{-\delta - m^p}{\sigma^p}\right). \quad (22)$$

There are two dependent variables in the above equations, namely m^p (mean of the perceived rate of price change) and σ^p (standard deviation). The explanatory variables comprise: a^p , b^p , c^p , d^p , e^p (fractions of respondents choosing the respective replies to the survey question) and δ (parameter determining the length of the indifference interval). After solving the equations (20)-(22),⁷ the following results are obtained:

$$m^p = -\delta \cdot \frac{A^p + B^p}{A^p - B^p}, \quad (23)$$

⁷ Only two of the equations (20)-(22) are independent.

$$\sigma^p = 2 \cdot \delta \cdot \frac{1}{A^p - B^p}, \quad (24)$$

where: $A^p = Nz^{-1} \left[1 - (a^p + b^p + c^p) \right]$, $B^p = Nz^{-1} (e^p)$.

According to equation (23), the perceived rate of inflation is a function of the distribution of responses to the survey question and the parameter δ , which is called the scaling factor. While quantifying perceived inflation in the euro area Forsells and Kenny (2002, 2004) refer to a concept of "backward unbiasedness" to derive δ . In a given period T the scaling factor is calculated on the basis of the assumption that if its values were to be constant in all periods prior to T , the average value of the perceived inflation would equal the average actual rate of inflation (π), i.e.:

$$\frac{1}{T} \sum_{t=1}^T \pi_t^p = \frac{1}{T} \sum_{t=1}^T \pi_t. \quad (25)$$

Using the equation (23), the condition of backward unbiasedness (25) may be expressed as:

$$\frac{1}{T} \sum_{t=1}^T \left(-\delta_t \cdot \frac{A^p + B^p}{A_t^p - B_t^p} \right) = \frac{1}{T} \sum_{t=1}^T \pi_t, \quad (26)$$

and solved with respect to δ_T , which in this stage of quantification procedure is treated as constant over time:

$$\delta_1 = \delta_2 = \dots = \delta_T. \quad (27)$$

The resulting formula for the scaling factor is as follows:

$$\delta_T = \frac{-\sum_{t=1}^T \pi_t}{\sum_{t=1}^T \left(\frac{A^p + B^p}{A_t^p - B_t^p} \right)}. \quad (28)$$

While making quantification of the perceived rate of inflation, it is assumed that the scaling factor may vary over time and for each period prior to T the parameter δ is calculated on the basis of analogous expression:

$$\delta_{T-j} = \frac{-\sum_{t=1}^{T-j} \pi_t}{\sum_{t=1}^{T-j} \left(\frac{A_t^p + B_t^p}{A_t^p - B_t^p} \right)}. \quad (29)$$

Such a way of determining the scaling factor has two advantages with respect to assuming that δ is constant over time. Firstly, in this case the quantification procedure does not necessarily impose unbiasedness of the perceived rate of inflation. Secondly, if an additional observation is added, past estimates of inflation perception do not have to be revised. However, there are also shortcomings of the above described method. In particular, fractions of respondents claiming that prices are much higher, quite a bit higher and a little higher are analysed as the homogenous group of individuals declaring that prices are higher. In this way the quantification procedure ignores an important part of information included in the movements taking place within those percentages of respondents. Aggregation of those responses leads to another weakness of the quantification method, namely to its restricted flexibility. Having only one indifference interval and such a method of its estimation, in which new observations have a small impact on the scaling factor, changes in the distribution of responses to the survey question – even those looking insignificant – may have disproportional impact on the estimate of the perceived rate of inflation and, consequently, on the subjectified measure of inflation expectations.⁸

⁸ It should be reminded that there are four endogenous variables in the adjusted Carlson and Parkin (1975) approach used to obtain numerical measures of inflation expectations, which adjust the distribution of the expected rate of inflation to patterns of responses to the survey question. They contain: mean and standard deviation of the distribution as well as thresholds of two indifference intervals, centred on the current rate of inflation and on the rate of inflation equal zero (see: Łyziak, 2003). Quantifying the perceived rate of inflation with the procedure based on the original version of Carlson and Parkin (1975) method and the assumption of backward unbiasedness, the scaling factor is set endogenously, but outside the quantification procedure. It leads to a relatively high volatility of the perceived rate of inflation. As experiences gathered while deriving estimates of the perceived rate of inflation in Poland and in the euro area suggest, this feature may be particularly relevant under a specific distribution of responses to the survey question. If the fractions of respondents declaring that prices are lower than 12 months ago or are about the same become relatively small, even slight changes in the distribution of responses to the survey question may lead to intuitively unrealistic jumps in the quantification result.

3 What Do We Know about Consumer Inflation Expectations in Poland?

3.1 *Inflation expectations and NBP inflation targets*

Figure 3 presents the current rate of inflation and its perception, as calculated on the basis of qualitative survey data in the way described above. Quantification results show a significant gap between both series, starting from 2002. It seems that the respondents did not adequately notice the fall in price dynamics in 2002-2003.⁹ Differences between the official measure of current inflation and the perceived rate of price change lead to changes between objectified and subjectified measures of consumer inflation expectations (Figure 5).¹⁰

What is the first thing noticed while analysing the performance of consumer inflation expectations in Poland in 1992-2003? It is probably the observation of how deeply their level and volatility were reduced. If one compares consumer inflation expectations with current inflation and the inflation target, it appears that expectations were going down, following the observed price dynamics (Figure 4). Starting from 2002, both measures of inflation expectations became broadly consistent with the inflation target set by the National Bank of Poland or even lower than that (Figure 5). At a first glance this would mean that the consumer inflation expectations were anchored. However, starting from the mid-2003 consumer inflation expectations have been rising, approaching the upper limit of the NBP inflation target tolerance range¹¹ and even exceeding it. To some extent it may be attributed to the rise in inflation, although the major factor influencing inflation expectations was the fear of price increases after Poland's accession to the EU. The fears got particularly strong during the final months preceding the accession.¹² Additional survey results show that price growth was expected in all examined product groups, such as food, clothing and footwear, cars, electronics and household equipment, houses or telephone call charges.¹³

⁹ The GfK survey question concerning the perception of price changes refers to the "costs of living", not to the official CPI. Differences between survey-based perception and the official measure of the current rate of inflation may be then stimulated by differences in the definition of inflation between consumers and statisticians.

¹⁰ Objectified measures of Polish consumer inflation expectations are quantified on the basis of Ipsos survey data (sample starts 1992), the subjectified ones on the basis of GfK Polonia (EC Consumer Survey) data (sample starts 2001).

¹¹ Nowadays the NBP inflation target is set at 2.5% with a symmetrical tolerance range for deviations of ± 1 percentage point.

¹² EC Consumer Survey data on inflation expectations and quantification results show that similar tendencies were observed in remaining new EU member states (see: Annex).

¹³ For details see: National Bank of Poland (2004a), pp. 12-13.

Figure 3 Current inflation and perceived rate of inflation (2001-2004)

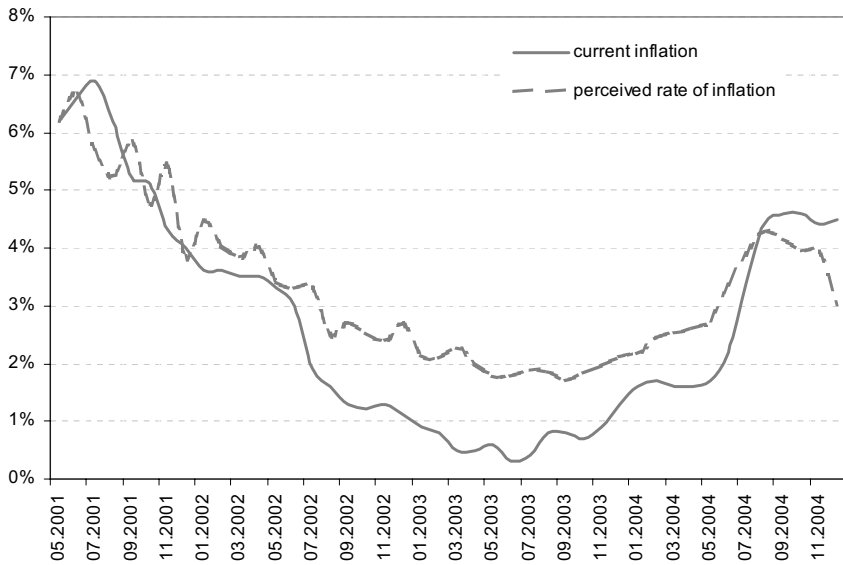


Figure 4 Consumer inflation expectations, indifference intervals, current inflation and actual inflation (1992-2004)

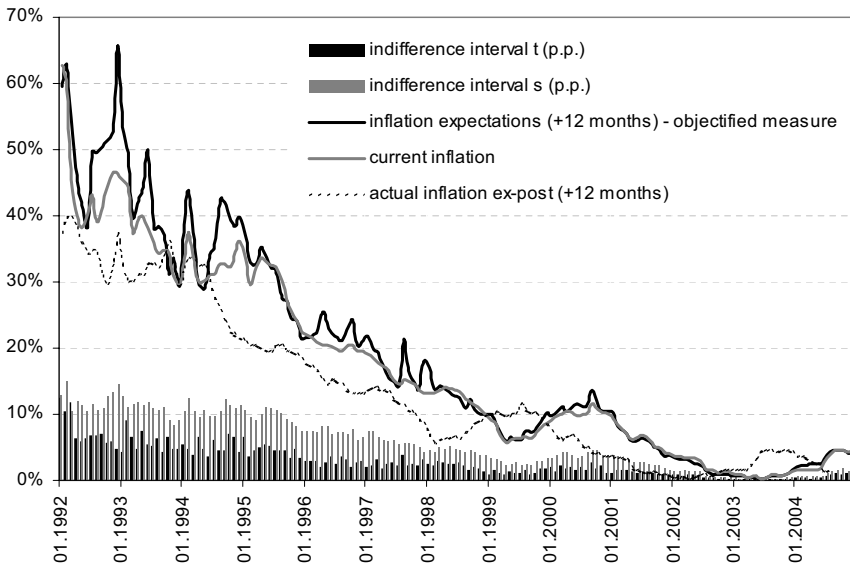
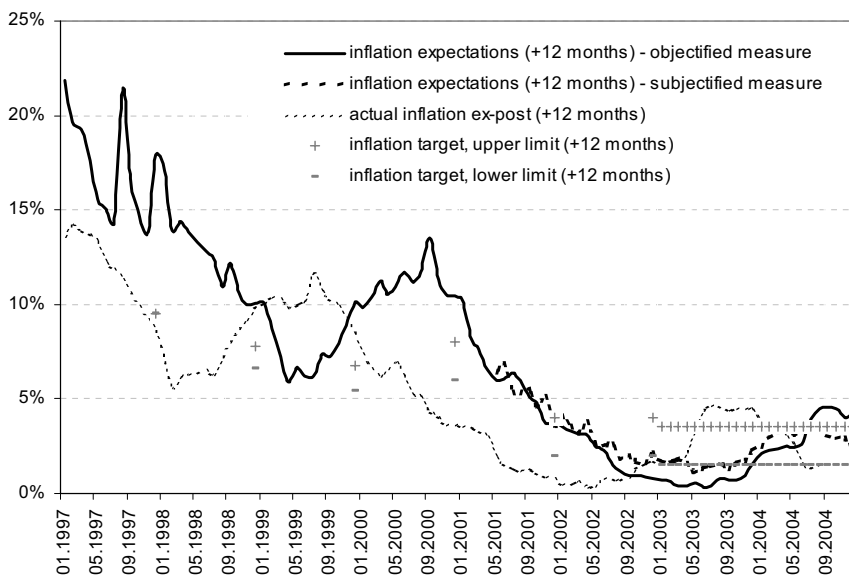


Figure 5 Consumer inflation expectations and the NBP inflation target (1997-2004)



Note: Up to the end of 2003 the National Bank of Poland set its short-term inflation target for the end of the year.

3.2 Features of consumer inflation expectations in Poland – results of previous studies

While interpreting the term: "anchoring inflation expectations" in a broader context, it is necessary to analyse the formation of expectations in detail. Proper understanding of the way, in which expectations are formed, is crucial for assessing the effectiveness of monetary policy and predicting future co-movements of inflation and inflation expectations.¹⁴ Summing up the results of previous studies, in which objectified measures of expectations were used, it occurs that Polish consumer inflation expectations do not fulfil principal requirements of the rational expectations hypothesis, being neither unbiased nor macroeconomically efficient (Table 2). They are determined mainly by changes in the current rate of inflation, which reduces their role in the monetary transmission mechanism. Monetary policy impulses are not able to influence private expectations directly, but only by affecting inflation itself. Short-term effects of changes in the current rate of inflation depend on the direction of its change, being stronger in the case of increases in the observed price dynamics and weaker in the case of the fall in inflation. Also in the long-run, consumer inflation expectations in Poland are linked to the current rate of inflation instead of the actual inflation ex-post.

¹⁴ Objectified measures of Polish consumer inflation expectations are used and endogenised in NSA – one of the NBP structural models. See: Kłos *et al.* (2005).

Table 2 Features of consumer inflation expectations in Poland – results of previous studies ^{a)}

Study	Sample period	Conclusions
Łyziak (2000)	1992-1999	<p>Polish consumer inflation expectations are usually close to the current rate of price change. There were episodes in 1992-1998 when expectations were even higher than current inflation, which was caused by a coincidence of economic, political and social circumstances.</p> <p>Relatively higher inflation was expected by older, less educated respondents with lower income, whereas younger, better educated and better paid respondents expected lower inflation rates.</p> <p>Throughout the analysed period, the gap between these extreme groups narrowed. The greatest divergence of inflation expectations remains in the segment of per capita household income.</p>
Łyziak (2001)	1992-2000	<p>Unbiasedness condition of the rational expectations hypothesis rejected.</p> <p>The reaction of inflation expectations (measured in absolute terms) to positive changes in current rate of inflation stronger than the reaction to negative changes in current rate of inflation.</p> <p>Quantified measures of consumer inflation expectations useful in macroeconomic modelling.</p>
Brzoza-Brzezina et al. (2002)	1992-2001	<p>Unbiasedness condition of the rational expectations hypothesis rejected.</p> <p>The reaction of inflation expectations (measured in absolute terms) to positive changes in current inflation rate stronger than the reaction to negative changes in current inflation rate.</p>
Łyziak (2003)	1992-2002	<p>The ongoing process of disinflation, which has resulted in Polish consumer expectations gradually converging with those in the euro area. This process was noticeably intense in 2001-2002.</p> <p>However, unbiasedness and macroeconomic efficiency hypotheses rejected – Polish consumer inflation expectations do not fulfil rational expectations hypothesis. There are no signs of growing efficiency.</p> <p>The reaction of Polish consumer inflation expectations (measured in absolute terms) to positive changes in current inflation rate stronger than the reaction to negative changes in current inflation rate.</p>
a)	In all the studies considered objectified measures of inflation expectations were used. They were quantified on the basis of qualitative Ipsos survey data with the use of a probability approach.	

Interpreting these results one should be aware that at least to some extent it is the design of a survey question and the assumptions of the quantification procedure that impose a close relationship between the current inflation rate and consumers' inflation expectations and produce a sort of adaptive expectations (Nardo, 2003). However, these assumptions do not determine fully the properties of survey-based series of inflation expectations. It may be noticed while comparing inflation expectations of consumers in Poland and in the euro area, whose features occur quite different, although both measures are calculated in an analogous manner (Table 3).

Table 3 **Features of consumers' inflation expectations in euro area and in Poland**^{a)}

		Polish consumers' inflation expectations (1992:01-2002:12)	Euro area consumers' inflation expectations (1985:01-2002:12)
Forecast performance statistics vs. naive expectations (in parentheses)	ME	6.99 (5.05)	-0.33 (0.20)
	MAE	7.68 (5.80)	0.76 (0.75)
	MAPE	0.75 (0.68)	0.29 (0.32)
	RMSE	0.92 (0.50)	0.01 (0.01)
Formation of inflation expectations	Rationality:		
	- Mean of forecast errors	6.99	-0.33
	- Biasedness	Biased upwards	Biased downwards
	- Efficiency	Constrained use of macroeconomic information, no signs of increasing macroefficiency.	Macroeconomic variables taken into account while forming expectations, increasing macroefficiency [Forsells and Kenny (2002)].
	The long-run relationship with:	Current inflation	Actual inflation ex-post
	Symmetry of responses to changes in current rate of inflation	Reaction of inflation expectations (measured in absolute terms) to positive changes in current rate of inflation stronger than to negative changes in current rate of inflation.	The same reaction of inflation expectations (measured in absolute terms) to positive and negative changes in current rate of inflation.
	Maximum response of inflation expectations to temporary increase in current rate of inflation of 1 percentage point (in percentage points)	1.45	0.70
	Maximum response of inflation expectations to temporary decrease in current rate of inflation of 1 percentage point (in percentage points)	0.85	0.70

a) In both cases objectified measures of inflation expectations were used. They were quantified on the basis of qualitative survey data with the use of a probability approach.

Source: Łyziak (2003), pp. 49-50.

4 Formation of Polish Consumer Inflation Expectations – New Empirical Findings

4.1 Testing unbiasedness of consumer inflation expectations in Poland

This section aims at analysing the formation of consumer inflation expectations in Poland taking into account an updated sample of observations. While examining two main requirements of the rational expectations hypothesis, namely unbiasedness and macroeconomic efficiency (Lloyd, 1999), inflation expectations are compared to the actual inflation ex-post, with reference to which they are formed. Therefore the period characterised by the EU-bubble – which is expected to affect expectations only temporarily – is not considered. Due to data availability, most of the tests use objectified measures of expectations.

An important feature of inflation expectations, one that is a focus of ongoing debate among economists, is the degree to which they are consistent with the actual inflation, ex-post. A frequent assumption made in macroeconomic models is that inflation expectations are rational, which means that economic agents fully exploit all available information and do not commit systematic forecast errors.¹⁵ In other words, their expectations are unbiased and efficient predictors of actual inflation, which is equal to expected inflation on average and to expected inflation plus a random forecast error period by period. In line with the rational expectations hypothesis, the coefficients α and β in the equation (30) should be equal to zero and one, respectively:¹⁶

$$\pi_{t|t-n}^e \equiv \alpha + \beta \cdot \pi_t + \varepsilon_t, \quad (30)$$

where π_t denotes the actual inflation in period t , $\pi_{t|t-n}^e$ is the expectation of inflation at time t formed at time $t-n$, while ε_t is a white-noise error.

Confronting Polish consumer inflation expectations with actual inflation ex-post, forecast errors are computed in the following way:

$$e_t = \pi_t^e - \pi_{t+12}. \quad (31)$$

In line with the rational expectations hypothesis, forecast errors should have a zero mean. In addition, non-overlapping errors in predicting inflation should be uncorrelated – otherwise agents could improve their expectations by taking better account of past errors.¹⁷

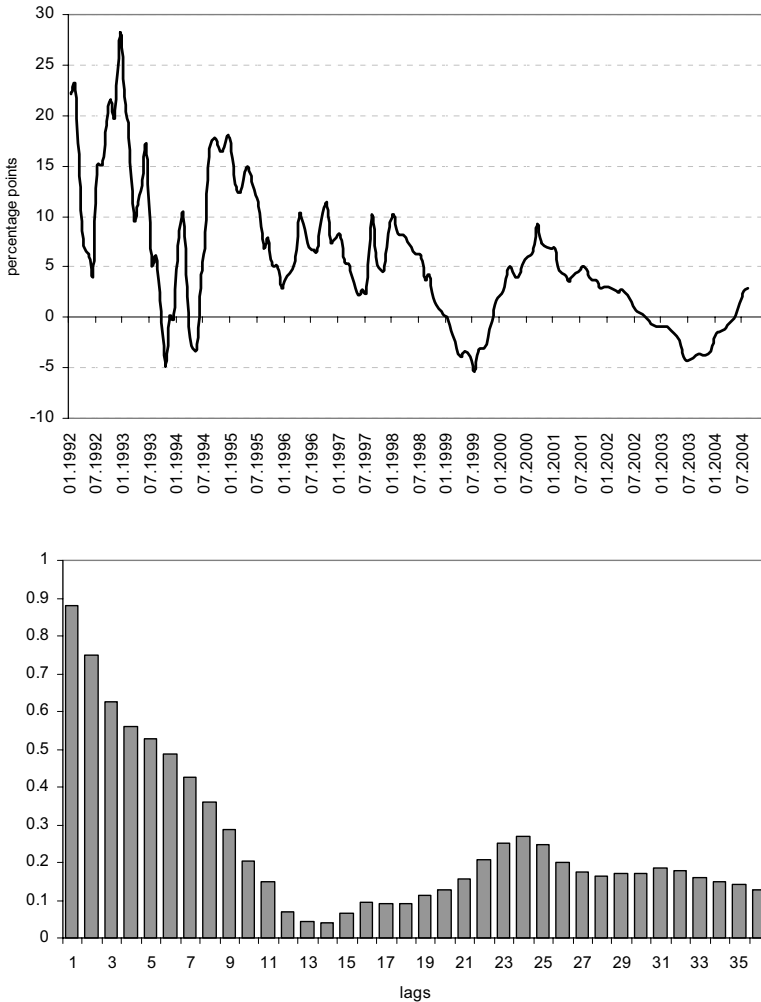
¹⁵ Stevenson, Muscatelli and Gregory (1988), pp. 73-76.

¹⁶ See: Bakhshi and Yates (1998), p. 9.

¹⁷ Grant and Lloyd (1999) point out that in early studies the existence of a strong serial correlation in expectational errors was commonly interpreted to be inconsistent with the rational expectations hypothesis. However, such a judgement is today considered invalid because of overlapping forecast intervals (agents are frequently unaware of their recent errors at the time they have to report new predictions). Uncertainty about the persistence of shocks can also give rise to correlated forecast errors.

For monthly data and expectations formed for 12 months ahead, the errors are overlapping and this may lead to some positive autocorrelation, although it should dampen down for lags greater than 12. As Figure 6 demonstrates, neither of the desirable features mentioned above are supported by the Polish data: the mean of the error is positive (equal approximately to 6 percentage points in 1992-2003) and non-overlapping errors seem to be positively correlated in the longer horizon.

Figure 6 Expectation errors and their autocorrelation



To carry out a formal check of the rationality of Polish consumer expectations, the approach suggested in Bakhshi and Yates (1998) has been applied. Since both actual inflation and consumer inflation expectations are non-stationary,¹⁸ the cointegration between these variables is tested first. The Johansen cointegration test indicates that there is one cointegrating equation at both the 5% and 1% significance levels. This yields the following long-run relationship between consumer inflation expectations and actual inflation (standard errors in parentheses):

$$\pi_{t/t-12}^e = 0.001 + 1.12 \cdot \pi_t + \varepsilon_t \quad (32)$$

(0.005) (0.03)

Sample: 1994.02-2004.06

Observations: 125

Trace test indicates 1 cointegrating equation(s) at both 5% and 1% levels.

Max-eigenvalue test indicates 1 cointegrating equation(s) at both 5% and 1% levels.

Under the rational expectations hypothesis, the cointegrating vector should have a null constant term and opposite coefficients for the expected and actual inflation. The joint restriction of a unit coefficient and zero constant is rejected: the LR statistic is equal to 10.2.¹⁹ Thus, consumer inflation expectations in Poland seem to be a biased predictor of future price movements.

It should be noted that a robust rationality test would require data measured with the use of quantitative scales, not qualitative data converted into indicators of inflation expectations based on the assumptions of probability methods. However, in the Polish case quantitative questions concerning inflation expectations, as included in the GfK Polonia consumer survey starting from May 2003, are excessively difficult for a significant part of respondents, who declare random numbers as inconsistent with opinions expressed in a qualitative manner (Łyziak and Stanisławska, 2005).²⁰ Therefore, their usefulness is constrained.

¹⁸ Actual inflation (year to year) and expected inflation are both I(1). ADF statistics on the levels of both variables are equal to -1.51 and -1.89, respectively, while on the first differences they are equal to -11.38 and -8.63.

¹⁹ Alternatively, the cointegrating equation was estimated with Ordinary Least Squares and the Wald coefficient test was used to examine the rationality of Polish consumer inflation expectations. The results confirm that objectified measures of consumer expectations in Poland were biased.

²⁰ Similar problems with asking consumers about their inflation expectations in a quantitative manner occur in Denmark. Buiten and Rooijackers (2003) demonstrate that in the Dutch Consumer Survey aggregate (point) estimates are not representative, contain a statistical bias, and are in part arbitrary and imprecise. Quantitative questions seem to be difficult for a substantial part of consumer population, which leads to inconsistencies in the point estimates for people expecting higher price increases than currently: about one third of the respondents actually give a lower point estimate. Polish experiences with the use of quantitative questions on price perception and expectations are even more disappointing. It is true that there is a consistency between qualitative and quantitative

4.2 *Testing macroeconomic efficiency of consumer inflation expectations in Poland*

An important feature conditioning expectations' rationality is their macroeconomic efficiency. Literature distinguishes two degrees of macroeconomic efficiency. The weak-form efficiency of inflation expectations requires expectational errors (defined as the difference between the expected and actual rate of inflation) to be orthogonal to an information set that includes only past values of inflation. The strong-form efficiency requires expectational errors to be orthogonal with respect to a much wider information set, encompassing a range of macroeconomic variables that are thought to influence price behaviour. In other words, agents are supposed to effectively incorporate information about all the variables that a state-of-the-art model of inflation would include (Lloyd, 1999).

In testing macroeconomic efficiency of Polish consumers' inflation expectations, the method suggested in Forsells and Kenny (2002, 2004) and also in Mehra (2002) is employed. A sequence of equations of the following structure:

$$e_t = \alpha + \beta \cdot \Omega_t + u_t, \quad (33)$$

is estimated, where e denotes expectational errors and Ω represents the set of information variables which are relevant for predicting inflation and which are available at the time when expectations are formed. Due to possible problems with multicollinearity, which could appear while estimating equation (33) in a multivariate context, univariate regressions are run, in which the dependent variable is the annual change in the information variable at the time when the expectations were formed. A statistically significant β suggests that agents failed to make the best use of the selected information variable in assessing future price developments.

The method used to verify the macroeconomic efficiency of Polish consumer inflation expectations differs from the approach of Forsells and Kenny (2002, 2004) in two ways. Firstly, due to a strong autocorrelation of forecast errors, an additional estimate of an extended version of the test equation (33) is performed, with the lagged forecast error on its right-hand side. This substantially improves the statistical properties of the estimation results. Secondly, data publication lags are taken into account, so that information variables effectively known to respondents when the survey is carried out are used in the test equation. Four groups of information variables are considered: interest rates, exchange rates, demand variables, and price and cost variables. The test results based on objectified measures of inflation expectations are presented in Table 4 below, both for the full sample period (1992-2003) and for two subperiods (1992-1998; 1999-2002). The selected cut-off corresponds to the adoption

responses on an aggregate level, which means that respondents declaring higher inflation perception and expectations in the qualitative part of the GfK Polonia survey provide also higher numerical responses on average. However, the inconsistency between qualitative and quantitative declarations on an individual level is more visible than in the Dutch case: the percentage of respondents declaring that prices will rise at faster (slower) rate and giving inconsistent numbers approaches 37% (47%) on average.

Details in: Łyziak and Stanisławska (2005).

of direct inflation targeting by the National Bank of Poland. In addition, Table 4 contains the results of macroeconomic efficiency tests based on both objectified and subjectified measures of consumer inflation expectations in Poland, covering the most recent observations (2001-2003).

Estimation results indicate that Polish consumers' use of available information seems to be far from optimal, and even weak-efficiency requirements are not fulfilled. In the years 1992-2003 the variables taken into account by consumers in formulating inflation predictions mainly comprised exchange rates and producer prices. The remaining categories analysed do not appear to be given adequate consideration, since they are statistically significant in explaining expectational errors (although in some cases different specifications of the test equation lead to contradictory conclusions).

Table 4 Testing the macroeconomic efficiency of Polish consumer inflation expectations in 1992-2003, objectified measure

Equation:	$e_t = \alpha + \beta \cdot \Omega_t + u_t$						$e_t = \alpha_0 + \alpha_1 \cdot e_{t-1} + \gamma \cdot \Omega_t + v_t$					
Period:	1992:01 - 2003:06		1992:01 - 1998:12		1999:01 - 2003:06		1992:01 - 2003:06		1992:01 - 1998:12		1999:01 - 2003:06	
	β	Prob.	β	Prob.	β	Prob.	γ	Prob.	γ	Prob.	γ	Prob.
Interest rates												
$\Delta(\text{WIB1M})$	0.15	.43	-0.37	.02**	0.54	.00***	0.11	.00***	0.03	.74	0.13	.00***
$\Delta(\text{WIB3M})$	0.20	.19	-0.03	.88	0.51	.00***	0.10	.02**	0.06	.49	0.13	.00***
Exchange rates												
$\Delta(\text{PLN/USD})$	0.10	.13	-0.06	.58	-0.02	.86	0.02	.37	-0.01	.81	0.05	.02**
$\Delta(\text{PLN/EUR})$	-0.13	.07*	0.15	.44	-0.30	.00***	-0.02	.27	0.09	.47	-0.04	.02**
Demand variables												
$\Delta(\text{IOUT})$	0.39	.00***	0.38	.00***	0.17	.09*	0.07	.08*	0.09	.28	0.07	.00***
$\Delta(\text{U})$	-0.62	.01**	0.22	.71	1.04	.01***	-0.06	.57	0.04	.88	0.17	.19
Price and cost variables												
$\Delta(\text{CPI})$	0.40	.03**	0.61	.00***	0.70	.00***	0.10	.16	0.24	.06*	0.15	.01***
$\Delta(\text{PPI})$	0.01	.94	0.08	.51	0.09	.66	0.01	.80	0.02	.77	0.06	.09*
$\Delta(\text{FPI})$	0.29	.00***	0.31	.00***	0.40	.00***	0.05	.11	0.11	.02**	0.10	.00***

Notes: *, **, *** denote significance at .1, .05, .01 level.

WIB1M = 1-month interbank offered rate *IOUT* = industrial output *CPI* = consumer price index
WIB3M = 3-month interbank offered rate *U* = unemployment rate *FPI* = food price index (y/y)
PPI = producer price index (y/y)

Table 5 Testing the macroeconomic efficiency of Polish consumer inflation expectations in 2001-2003, objectified and subjectified measure

Equation:	$e_t = \alpha + \beta \cdot \Omega_t + u_t$				$e_t = \alpha_0 + \alpha_1 \cdot e_{t-1} + \gamma \cdot \Omega_t + v_t$			
Measure, period:	Objectified, 2001:05-2003:06		Subjectified; 2001:05-2003:06		Objectified, 2001:05-2003:06		Subjectified; 2001:05-2003:06	
	β	Prob.	β	Prob.	γ	Prob.	γ	Prob.
	Interest rates							
$\Delta(\text{WIB1M})$	0.36	.16	0.28	.19	0.03	.47	-0.03	.49
$\Delta(\text{WIB3M})$	0.28	.41	0.21	.47	0.05	.32	-0.03	.54
	Exchange rates							
$\Delta(\text{PLN/USD})$	-0.11	.39	-0.11	.35	-0.03	.29	-0.01	.62
$\Delta(\text{PLN/EUR})$	-0.21	.00***	-0.18	.00***	-0.05	.00***	-0.05	.06*
	Demand variables							
$\Delta(\text{IOUT})$	-0.42	.00***	-0.36	.00***	0.04	.19	-0.03	.56
$\Delta(\text{U})$	1.11	.00***	0.95	.00***	-0.05	.64	0.08	.37
	Price and cost variables							
$\Delta(\text{CPI})$	-1.13	.01***	-1.02	.00***	0.19	.06*	-0.11	.32
$\Delta(\text{PPI})$	-0.53	.00***	-0.44	.00***	0.09	.26	-0.09	.15
$\Delta(\text{FPI})$	0.08	.83	0.01	.97	0.10	.00	-0.01	.91

Notes: See Table 4 for explanations.

Interestingly, the comparison of the two subperiods 1992-1998 and 1999-2003 (inflation targeting regime) does not give evidence that the macroeconomic efficiency of Polish consumer inflation expectations tends to increase over time. On the contrary, some of the information variables (e.g. interbank interest rates) taken into account in the first of the subperiods selected were not used adequately in the second. However, the results change substantially for the period of 2001-2003, when significant changes in the distribution of responses to the survey question and in the level of quantified measures of inflation expectations were recorded. Tests performed with both measures of inflation expectations show that interest rates and changes in food prices moved to the group of information variables adequately considered in formulating inflation expectations, while demand variables produce mixed results. Due to a very short sample covered in this analysis, one should be cautious in making conclusive comments. These findings may be interpreted rather as the first signs of slight changes in the way, in which Polish consumers form their expectations.

5 Conclusions

Probability methods presented in this paper offer two ways of measuring consumer inflation expectations on the basis of qualitative surveys. Objectified indicators of expected inflation "translate" respondents' subjective feelings into numbers consistent with statistical figures by assuming that the perception of current price movements coincides with official inflation figures. Subjectified measures of inflation expectations do not rely on that assumption. Instead, they make use of survey data on the perceived rate of inflation, which – after quantification – is used as an input in the quantification of expected inflation.

It should be noted that the specific assumptions of probability methods described in the paper may complicate the interpretation of the degree of rationality of Polish consumers' inflation expectations as tested with the use of survey-based measures. In particular, both quantification methods induce a statistically significant relationship between the current rate of inflation and the quantified indicators of expectations, which is consistent with the design of a qualitative survey question. An alternative and conceptually more robust approach of testing the rationality of Polish consumers' inflation expectations would be to refer to quantitative surveys, in which respondents declare numerically the expected rate of price change. However, in the Polish case questions of this type are excessively difficult for a significant part of consumers, who declare random numbers as inconsistent with opinions expressed in a qualitative manner.

Quantification results suggest that in 2002-2003 objectified and subjectified measures of Polish consumer inflation expectations became broadly consistent with the inflation target set by the National Bank of Poland or even lower than that. However, starting from mid-2003 fears of a rapid rise in prices resulting from the EU accession dominated respondents' opinions about future price developments and made inflation expectations temporarily increase towards the upper limit and even above of the NBP inflation target tolerance range.

There is mixed evidence on the impact of inflation targeting on the formation of Polish consumer inflation expectations. There are signs of consumers making a slightly better use of available information in 2001-2003; however, even the weak efficiency requirements are still far from being fulfilled.

References

- Bakhshi, H. and A. Yates. 1998. "Are UK inflation expectations rational?" Bank of England, Working Paper Series No. 81.
- Batchelor, R. A. 1982. "Expectations, output and inflation. The European experience," *European Economic Review* 17, pp. 1-25.
- Batchelor, R. A. 1986. "The psychophysics of inflation," *Journal of Economic Psychology* 7, pp. 269-90.
- Berk, J. M. 1997. "Measuring inflation expectations: a survey data approach," De Nederlandsche Bank, DNB-Staff Reports.
- Berk, J. M. 2000. "Consumer inflation expectations and monetary policy in Europe," De Nederlandsche Bank, DNB-Staff Reports.
- Bernanke, B. S.; T. Laubach, F. S. Mishkin and A.S. Posen. 1999. *Inflation Targeting. Lessons from the International Experience*. Princeton: Princeton University Press.
- Brzoza-Brzezina, M.; B. Kłos, A. Kot and T. Łyziak. 2002. "Hipoteza neutralności pieniądza [Money neutrality hypothesis]," National Bank of Poland, NBP Paper No. 142, www.nbp.pl.
- Buiten, G. and B. Rooijackers. 2003. "First results of the quantitative questions on price changes in the Consumer Survey: an evaluation," typescript.
- Carlson, J. A. and J. M. Parkin. 1975. "Inflation expectations," *Economica* 42, pp. 123-38.
- Forsells, M. and G. Kenny. 2002. "The rationality of consumer inflation expectations: survey-based evidence for the euro area," European Central Bank, Working Paper No. 163.
- Forsells, M. and G. Kenny. 2004. "Survey Expectations, Rationality and the Dynamics of Euro Area Inflation," *Journal of Business Cycle Measurement and Analysis* 1:1, p. 13-42.
- Grant, A. P. and T. B. Lloyd. 1999. "Inflation expectations and rationality revisited," *Economic Letters* No. 62, pp. 331-38.
- Jonas, J. and F. S. Mishkin. 2003. "Inflation targeting in transition economies: experience and prospects," NBER Working Paper No. 9667
- Kłos, B.; R. Kokoszcyński, T. Łyziak, J. Przystupa and E. Wróbel. 2005. "Structural econometric models in forecasting inflation at the National Bank of Poland," National Bank of Poland, NBP Paper No. 31, www.nbp.pl.
- Knöbl, A. 1974. "Price expectations and actual price behavior in Germany," International Monetary Fund Staff Papers No. 21, pp. 83-100.
- Kokoszcyński, R. 2002. "Poland before the euro," *Journal of Public Policy*. 22:2, pp. 199-215.
- Lloyd, B. T. 1999. "Survey measures of expected U.S. inflation," *Journal of Economic Perspectives* 13:4, pp. 125-44.
- Łyziak, T. 2000. "Badanie oczekiwań inflacyjnych podmiotów indywidualnych na podstawie ankiet jakościowych [Examination of individuals' inflation expectations on the basis of qualitative surveys]," National Bank of Poland, *Bank i Kredyt* No. 6.
- Łyziak, T. 2001. "Monetary transmission mechanism in Poland. Theoretical concepts vs. evidence," National Bank of Poland, NBP Paper No. 19, www.nbp.pl.
- Łyziak, T. 2003. "Consumer inflation expectations in Poland," European Central Bank, ECB Working Paper no 287.
- Łyziak, T. and E. Stanisławska. 2005. *Consumer inflation expectations. Survey questions and quantification methods – the case of Poland*. forthcoming.
- Mahadeva, L. and G. Sterne, ed. 2000. *Monetary Policy Frameworks in a Global Context*. Routledge.
- Mehra, Y. P. 2002. "Survey measures of expected inflation: revisiting the issues of predictive content and rationality," Federal Reserve Bank of Richmond, *Economic Quarterly* 88:3, pp. 17-36.
- Mishkin, F. S. and K. Schmidt-Hebbel. 2001. "One decade of inflation targeting in the world: what do we know and what do we need to know?" NBER Working Paper No. 8397.
- Nardo, M. 2003. "The quantification of qualitative survey data: a critical assessment," *Journal of Economic Surveys* 17:5, pp. 645-68.

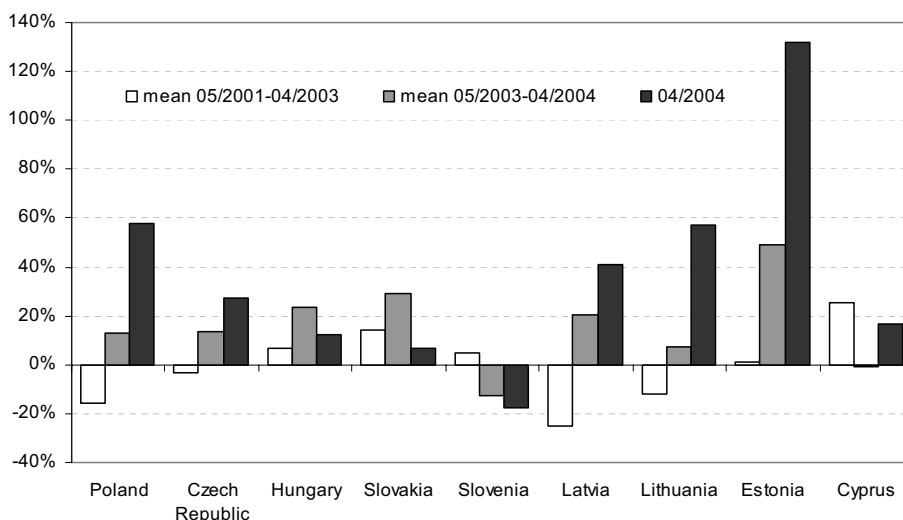
- National Bank of Poland. 1998. *Medium-term strategy of monetary policy*. Warsaw, www.npl.pl.
- National Bank of Poland. 2004a. *Inflation Report*. May 2004, Warsaw, www.nbp.pl.
- National Bank of Poland. 2004b. *Inflation Report*. August 2004, Warsaw, www.nbp.pl.
- Polański, Z. 2004. "Poland and the European Union: the monetary policy dimension. Monetary policy before Poland's accession to the European Union," National Bank of Poland, *Bank i Kredyt* 5.
- Stevenson, A.; V. Muscatelli and M. Gregory. 1988. *Macroeconomic theory and stabilisation policy*. London: Philip Allan.
- Taylor, M. P. 1988. "What do investment managers know? An empirical study of practitioners' predictions," *Economica* 55, pp. 185-202.
- Theil, H. 1952. "On the time shape of economic microvariables and the Munich business test," *Revue de l'Institut International de Statistique* 20, pp. 105-20.

Annex

There were significant shifts in the patterns of responses to the survey question on inflation expectations in a majority of the acceding countries before the EU enlargement, indicating that consumers were more and more afraid of a rapid price increase after the EU accession. It seems that the perspective of EU accession was the major cause of those shifts with some country-specific factors (changes in indirect taxes, price deregulations, increase of the current domestic inflation) and external factors (the increase of the oil price in international markets) playing a minor role.

Analysing changes in consumer inflation expectations in the new EU member states before the EU accession, the deviation of their objectified measures from the current rate of inflation was calculated for two periods. The first one comprises observations until April 2003, while the second one starts in May 2003, i.e. a year before the EU enlargement. Additionally, the indicator was derived for April 2004, that is the final month preceding the accession. As presented in Figure 7, substantial increase of inflation expectations relative to the current rate of inflation was recorded in the majority of analysed economies with Cyprus and Slovenia being the only exceptions.

Figure 7 Deviation of consumer inflation expectations from the current rate of inflation (in %) in the new EU member states



Source: Own calculations based on EC Consumer Survey, Ipsos and IFS data.

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